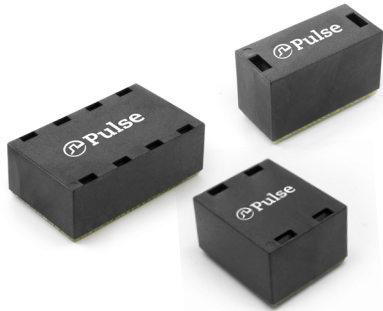


High Density 1Gigabit PoE/PoE+ SMD Modules

BGA Quad/Dual/Single port for flexible PCB placement
HX52xxNL, HX54xxNL, HX5610NL, and HX6xxxHL



- Compact SMT 1Gigabit PoE modules offering less than 140mm² /port density
- Reliable surface mount ball grid array
- Standard and Industrial Temperature range
- Modular construction exceeds IEEE802.3u/ab
- Options support 4pair PoE+ (70W) of DC power
- Designed to fit behind 2xN connectors
- RoHS-6, peak reflow temperature rating 245°C
- Supplied in Trays or Tape and Reel

Standard Range			Electrical Specifications @ 25°C - Operating Temperature 0°C to +70°C											
RoHS-6 Compliant Part Number	Number of Ports	Insertion Loss (dB Max)	Return Loss (dB Min)					Common Mode Rejection [CMMR] (dB Min)			Crosstalk (dB Min)			4P PoE Rating
		1-100MHz	1-30MHz	40MHz	50MHz	60-80MHz	100MHz	30-60MHz	80-100MHz	125MHz	30MHz	60MHz	100MHz	(Watts)
H5610NL	1	1.5	-18	-16	-14	-11	-10	-32	-25	-19	-44	-37	-33	35max
H5200NL	2	1.5	-18	-16	-14	-11	-10	-32	-25	-19	-44	-37	-33	35max
H5201NL	2	1.5	-18	-16	-14	-11	-10	-32	-25	-19	-44	-37	-33	30max
H5400NL	4	1.5	-18	-16	-14	-11	-10	-32	-25	-19	-44	-37	-33	35max
H5401NL	4	1.5	-18	-16	-14	-11	-10	-32	-25	-19	-44	-37	-33	30max

Industrial Range			Electrical Specifications @ 25°C - Operating Temperature -40°C to +80°C											
RoHS-6 Compliant Part Number	Number of Ports	Insertion Loss (dB Max)	Return Loss (dB Min)					Common Mode Rejection [CMMR] (dB Min)			Crosstalk (dB Min)			4P PoE Rating
		1-100MHz	1-30MHz	40MHz	50MHz	60-80MHz	100MHz	30-60MHz	80-100MHz	125MHz	30MHz	60MHz	100MHz	(Watts)
HX5610NL	1	1.5	-18	-16	-14	-10	-10	-32	-25	-19	-44	-37	-33	35max
HX5200NL	2	1.5	-18	-16	-14	-10	-10	-32	-25	-19	-44	-37	-33	35max
HX5201NL	2	1.5	-18	-16	-14	-10	-10	-32	-25	-19	-44	-37	-33	30max
HX5400NL	4	1.5	-18	-16	-14	-10	-10	-32	-25	-19	-44	-37	-33	35max
HX5401NL	4	1.5	-18	-16	-14	-10	-10	-32	-25	-19	-44	-37	-33	30max

Power over Ethernet ⁶			Electrical Specifications @ 25°C - Operating Temperature 0°C to +70°C / -40°C to +80°C											
RoHS-6 Compliant Part Number	Number of Ports	Insertion Loss (dB Max)	Return Loss (dB Min)					Common Mode Rejection [CMMR] (dB Min)			Crosstalk (dB Min)			4P PoE Rating
		1-100MHz	1-30MHz	40MHz	50MHz	60-80MHz	100MHz	30-60MHz	80-100MHz	125MHz	30MHz	60MHz	100MHz	(Watts)
H6600NL	1	1.5	-18	-16	-14	-11	-10	-32	-25	-19	-44	-37	-33	70max
HX6621NL	1	1.5	-18	-16	-14	-10	-10	-32	-25	-19	-44	-37	-33	70max
H6200NL	2	1.5	-18	-16	-14	-11	-10	-32	-25	-19	-44	-37	-33	70max
HX6221NL	2	1.5	-18	-16	-14	-10	-10	-32	-25	-19	-44	-37	-33	70max
H6400NL	4	1.5	-18	-16	-14	-11	-10	-32	-25	-19	-44	-37	-33	70max
HX6400NL	4	1.5	-18	-16	-14	-10	-10	-32	-25	-19	-44	-37	-33	70max

Notes:

- Header DAP with flammability Rating UL-94V-0
- MSL = Moisture Sensitivity Level: 1 per J-STD-020
- J-STD-075 R7m 235°C maximum
- Compliance to J-STD-002 Solderable at 245°C
- Reflow Profile, J-STD-020: LEVEL 1
- RoHS-6: Product does not contain 5 out of the 6 banned substances specified in the RoHS directive.
Some internal connections may contain lead in high-temperature solder (solder alloys containing more than 85% lead)
- Operating Temperature:
Standard "H" parts 0°C to +70°C
Industrial "HX" products -40°C to +85°C
- Storage Temperature:
Standard "H" parts -20°C to +125°C
Industrial "HX" parts -50°C to +125°C
- Contact Pulse for other connector option via the "Resources" link on the Pulse Electronics website.
- To order parts in Tape and Reel Packaging add a "T" suffix to the part number (*ie. HX6221NL becomes HX6221NLT).

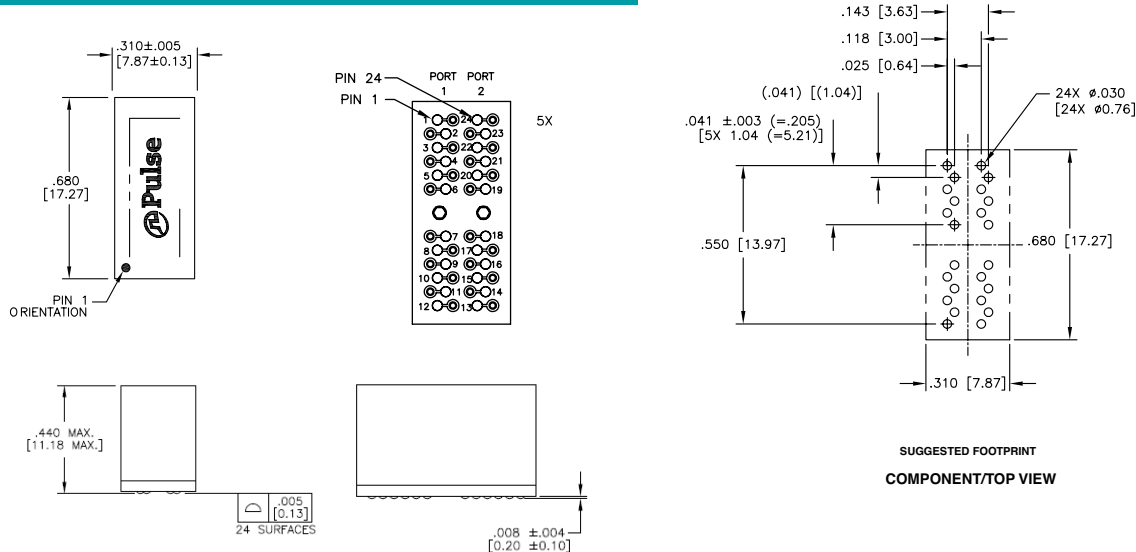
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BGA Quad/Dual/Single port for flexible PCB placement
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Mechanical

SINGLE PORT - H5610NL, HX5610NL, H6600NL and HX6621NL

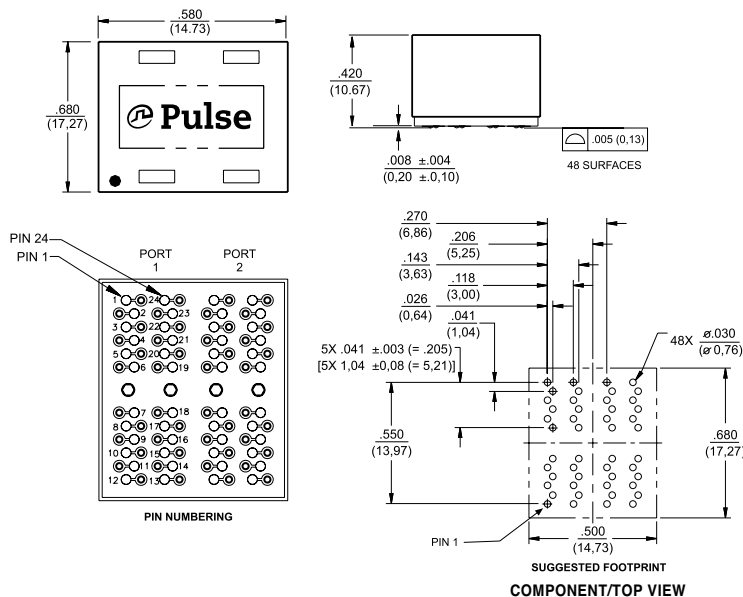


Weight 2.5 grams
 Tray/Box 60/600
 Reel/Box 300/1500

Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified,
 all tolerances are $\pm \frac{0.10}{0.25}$

DUAL PORT - H520xNL, HX520xNL, H6200NL and HX6221NL



Weight 5 grams
 Tray/Box 84/420
 Reel/Box 170/850

Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified,
 all tolerances are $\pm \frac{0.10}{0.25}$

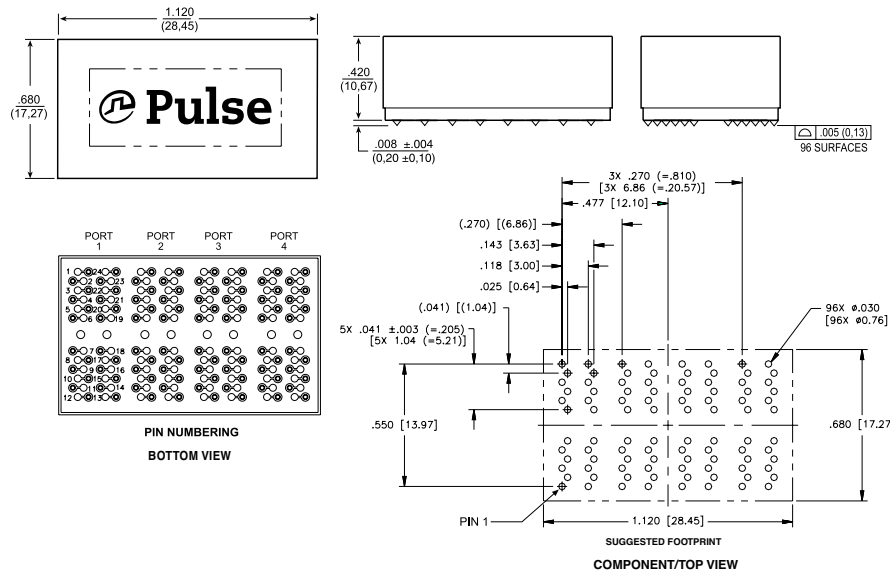
High Density 1Gigabit PoE/PoE+ SMD Modules

BGA Quad/Dual/Single port for flexible PCB placement
HX52xxNL, HX54xxNL, HX5610NL, and HX6xxHL



Mechanical

QUAD PORT - H540xNL, HX540xNL, H6400NL and HX6400NL



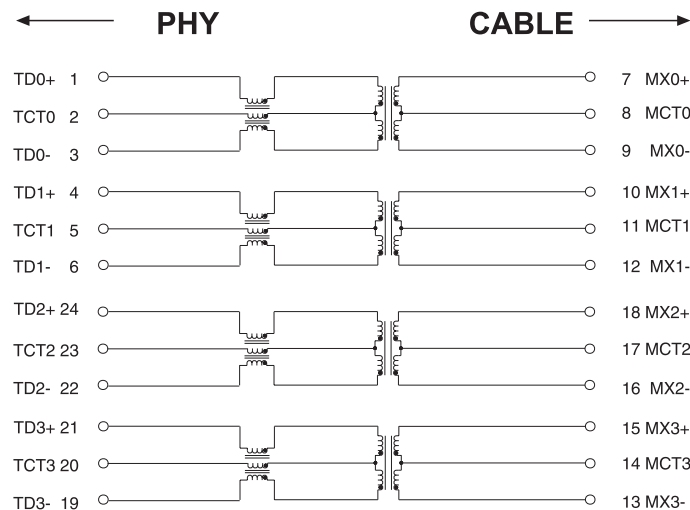
Weight 11 grams
Tray/Box 60/300
Reel/Box 170/850

Dimensions: $\frac{\text{Inches}}{\text{mm}}$

Unless otherwise specified,
all tolerances are $\pm \frac{0.10}{0.25}$

Schematic

H/HX5200NL, H/HX5400NL, H6600NL, HX6621NL, H6200NL, HX6221NL, H/HX6400NL



Schematic shown for one port

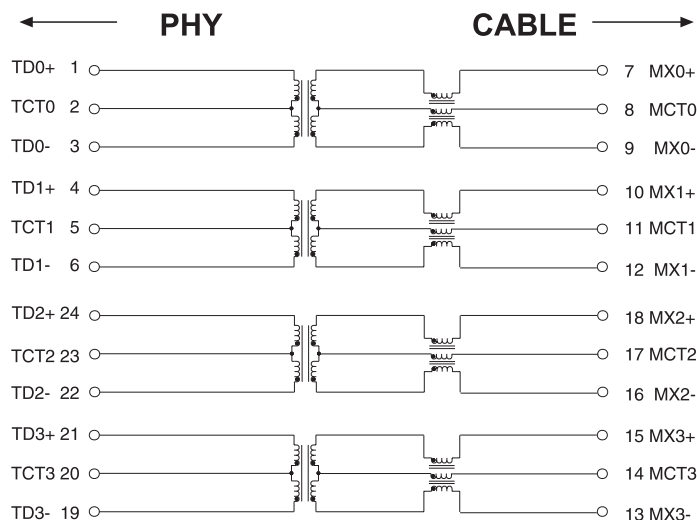
DUAL and QUAD designs use the same pad numbering for the 2 and 4 ports

High Density 1Gigabit PoE/PoE+ SMD Modules

BGA Quad/Dual/Single port for flexible PCB placement
HX52xxNL, HX54xxNL, HX5610NL, and HX6xxxHL

Schematic

H/HX5201NL, H/HX5401NL



Schematic shown for one port

DUAL and QUAD designs use the same pad numbering for the 2 and 4 ports

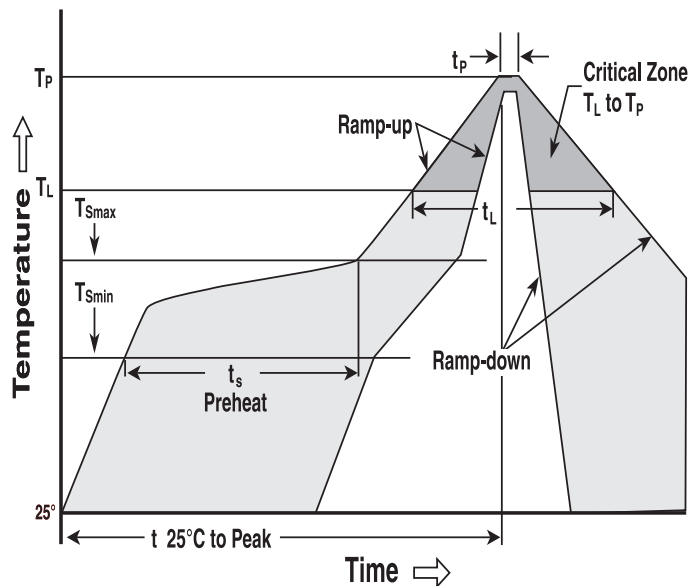
Soldering Information

Solder reflow profile conditions

Profile Feature		Lead-free Solder*
Pre-heat	Temperature Min (T_{Smin})	150°C
	Temperature Max (T_{Smax})	200°C
	Time (t_{Smin} to t_{Smax})	60-180 seconds
Reflow	Liquidus Temperature (T_L)	217°C
	Time (t_L)	60-150 seconds
Peak Temperature (T_P)		245°C ($\pm 5^\circ\text{C}$)
Time within 5°C of peak (T_P)		20-30 seconds
Average Ramp Up Rate (T_{Smax} to T_P)		3°C/second max
Ramp Down Rate		6°C/second max
Time 25°C to Peak Temperature (T_P)		8 minutes max
Parts should not exceed...		245°C

* See Curve

Typical reflow profile



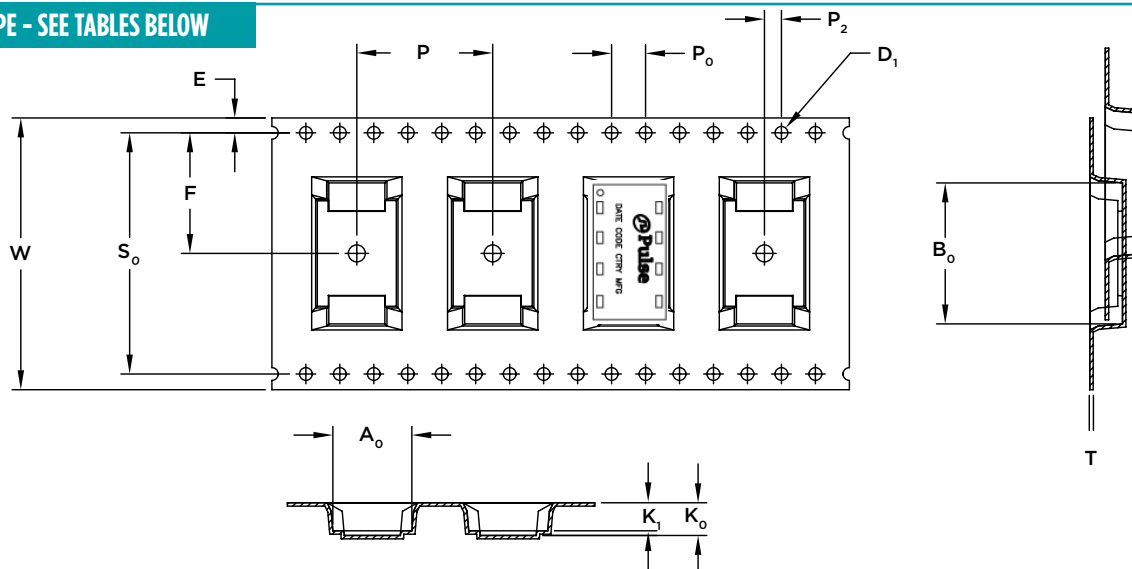
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Tape & Reel

CARRIER TAPE - SEE TABLES BELOW



SINGLE PORT MODULES

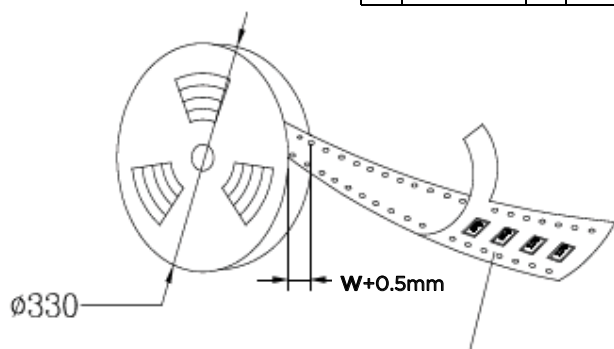
W	32.0±0.30	P	16.00	A ₀	8.20	B ₀	17.60
S ₀	28.40	P ₀	4.00	A ₁	-----	B ₁	-----
E	1.75	P ₂	2.00	A ₂	-----	B ₂	-----
F	14.20	D ₀	-----	K ₀	11.80	K ₁	11.30
T	0.50±0.05	D ₁	1.50 ±0.10 -0.00	QUANTITY PER REEL		300 pieces	

DUAL PORT MODULES

W	32.0±0.30	P	24.00	A ₀	17.40	B ₀	14.85
S ₀	28.40	P ₀	4.00	A ₁	-----	B ₁	-----
E	1.75	P ₂	2.00	A ₂	-----	B ₂	-----
F	14.20	D ₀	-----	K ₀	11.70	K ₁	11.20
T	0.50±0.05	D ₁	1.50 ±0.10 -0.00	QUANTITY PER REEL		170 pieces	

QUAD PORT MODULES

W	44.0±0.30	P	24.00	A ₀	17.60	B ₀	28.94
S ₀	40.40	P ₀	4.00	A ₁	-----	B ₁	-----
E	1.75	P ₂	2.00	A ₂	-----	B ₂	-----
F	20.20	D ₀	-----	K ₀	11.70	K ₁	11.20
T	0.50±0.05	D ₁	1.50 ±0.10 -0.00	QUANTITY PER REEL		170 pieces	



1. **Material:** Black Conductive Polystyrene
2. **Components per Reel:** see table
3. **Quantity per carton:**

5reels (44mm) x 170 = 850 pcs
 5reels (32mm) X 170 = 850 pcs
 5reels (32mm) x 300 = 1500 pcs

All Dimensions meet EIA-481-D requirements.

Component

For More Information:

Americas - prod_info_network_americas@yageo.com | Europe - prod_info_network_emea@yageo.com | Asia - prod_info_network_apac@yageo.com

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